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REAPPRAISAL OF TWO PLUMOSE RHYNCHOSPORAS OF THE SOUTHEASTERN UNITED STATES

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Rhynchospora, Section Eurhynchospora, in Canada, the United States and the West Indies, was treated taxonomically by Gale (Rhodora **46:** 89–278.) in 1944. According to this revision, Series Plumosae consists of three species: *R. plumosa* Ell., *R. intermedia* (Chapm.) Britt. and *R. oligantha* Gray, all characterized by the possession of unique perianth bristles. *Rhynchospora oligantha* var. *breviseta* Gale was originally described in this work.

This new variety was distinguished from *R. oligantha* var. *oligantha* (as var. *typica*) by the reduced condition of the perianth bristles to less than one-half the length of the achene, the ovoid shape and smaller size of the achene and the short-conic tubercle. At this time the ranges of the two varieties were considered to be mutually exclusive: var. *oligantha* was reported to occur along the Atlantic and Gulf Coastal Plain from New Jersey southward into Georgia and western Florida, thence westward into eastern Texas (and also in Central America); var. *breviseta* was reported from peninsular Florida, western Cuba, Jamaica and Hispaniola.

In the treatment of the same group (Sect. Plumosae), Kükenthal (Bot. Jahrb. **74:** 505–509. 1949.) recognized three species also. However, only two of these had been recognized as such by Gale. Accordingly, *Rhynchospora intermedia* was reduced to varietal status under *R. plumosa*, where, in addition, the new variety *interrupta* Kükenth. appeared. The plumose-

bristled *R. diadon* (Nees) Griseb. (*R. lunata* Griseb.), in effect excluded by Gale from Eurhynchospora largely on account of its "curious horned tubercle" (cf. Rhodora **46:** 95. 1944.), was re-instated in the Plumosae. *Rhynchospora oligantha* var. *oligantha* and var. *breviseta*, however, were maintained without change of status or extension of range.

Material collected since the appearance of Gale's monograph and which was not utilized by Kükenthal reveals that *Rhynchospora oligantha* var. *breviseta* is not only morphologically quite distinct, but that its geographical range is sympatric with that of the typical variety over a considerable area. In some areas, in fact, the two are known to occur side by side in the field and, although apparently flowering and fruiting over the same general period, maintain their distinctive morphological features without any indication of intergradation. This evidence, presented in detail below, is considered to be of sufficient magnitude to require the elevation of var. *breviseta* to specific status. The following change of status is thus made: **Rhynchospora breviseta** (Gale) stat. nov. based on *Rhynchospora oligantha* A. Gray var. *breviseta* Gale, Rhodora **46:** 129, 130. 1944.

The close relationship of *Rhynchospora breviseta* and *R. oligantha* is not questioned. The two species have in common the rugulose achenes, plumose perianth bristles, filiform leaves and culms and the cespitose habit of Series Plumosae. In addition, they have both axillary and terminal inflorescences of 1–several pedicellate spikelets, the inflorescences being both pedunculate and sessile and the spikelets disposed singly or as decompound fascicles. Both species are perennial by means of short, firm or ligneous, somewhat bulbous, crown-like rhizomes. The lowermost leaves consist of closed, truncate sheaths which may or may not bear short, greatly reduced blades. The typical cauline leaf is comprised of a closed, slenderly cylindric sheath, truncate at the apex, and a long, linear blade about ½ or ⅓ the width of the sheath. The blades are more or less concave or channeled throughout the serrulate basal portion and subterete or obtusely 4-angled and entire above.

The leaf tips differ according to the species: *R. oligantha* (Fig. 2) has entire, blunt-tipped leaves; *R. breviseta* (Fig. 7)

RHYNCHOSPORA OLIGANTHA (*Channell 3120*): Fig. 1, terminal inflorescence × 4; Fig. 2, leaf tip × 12; Fig. 3, achene × 12; Fig. 4, rachis × 4. R. BREVISETA (*Channell 3257*): Fig. 5, prophyll × 8; Fig. 6, terminal inflorescence × 4; Fig. 7, leaf tip × 12; Fig. 8, achene × 12; Fig. 9, rachis × 4. (Drawings kindly prepared by Ding Hou.)

has acute tips which are minutely serrulate on the margin. These differences have been previously overlooked. While generally representing a practical taxonomic character, it should be pointed out that the serrulations of the leaf tips of *R. breviseta* are so minute that they are sometimes obscured in herbarium material which has been prepared by gluing the specimens to the sheets. The glue acts to seal these minute teeth against the margin of the leaf causing the margin to appear entire or otherwise rendering the serrulations somewhat transparent and thus difficult to observe.

The achenes of *Rhynchospora oligantha* and *R. breviseta* are more nearly lenticular than those of the other members of Series Plumosae. Despite this general similarity, however,

the two species are remarkably distinctive on the basis of other achenial features. The achene of *R. oligantha* (Fig. 3) is broadly elliptic and has a conspicuous collar-like constriction at the apex, the upper flange of which surrounds the base of the conic-attenuate tubercle. The achene of *R. breviseta* (Fig. 8) is ovoid or obovoid in shape and is crowned by a depressed-conic tubercle giving the appearance of having been applied to the apex of the achene. Indeed, the achenial differences are so pronounced that there is little chance of confusing the two species on that basis alone.

The achenes of both species have been observed occasionally to be covered with a whitish, waxy bloom, although this is by no means a general feature of herbarium material. This pruinose condition is very conspicuous in freshly collected specimens but may disappear in the process of drying the specimens, especially if artificial heat is employed. There is considerable variation in the color of the achenes, this apparently varying to a certain extent with the degree of maturation attained. In individual spikelets of *R. breviseta*, which are oftentimes 8-fruited, the achenes may vary in color from manila-buff in the terminal portion of the spikelet, to castaneous in the central portion and, finally, dark blue or bluish black in the basal portion. The achenes are usually promptly shed at maturity; thus the dark-colored achenes are not often to be seen on herbarium sheets.

As the epithet connotes, the plumose perianth bristles of *Rhynchospora breviseta* are considerably shorter than those of *R. oligantha*. In the latter species the bristles vary from ½ the length of the achene to slightly longer than the achene, the basal portion being heavily plumose and the tips antrorsely serrulate; in the former the bristles are less than ½ the length of the achene and usually lack the antrorsely serrulate tips so pronounced in *R. oligantha* and are occasionally reduced to mere plumose tufts.

While there is a decided difference between *Rhynchospora breviseta* and *R. oligantha* in the size and shape of the spikelets where best developed, the considerable variation throughout the geographical ranges of the two species precludes the use of these as diagnostic characters. Nevertheless, the spikelets

of *R. breviseta* (Fig. 6) are, in general, longer and more slenderly fusiform in shape, the surface of the spikelet being somewhat torulose due to the arrangement of the 3–8 achenes in a scarcely imbricate, spiral series along the sides of the anfractuose rachis. This spirally zigzag, somewhat winged rachis is a conspicuous feature of *R. breviseta* (Fig. 9) even after the achenes are shed. Varying from 5 to 8(–10) mm. in length, the rachis remains intact well after the shedding of the spikelet scales and the achenes, even though it is a weakly organized, brittle structure which breaks easily under mechanical stress. The spikelets of *R. oligantha* (Fig. 1) are usually only 1–2(–3)-fruited, terete and relatively smooth, with little or no tendency to be torulose. The rachis (Fig. 4) is generally short and straight, somewhat clavate, 1–2(–3) mm. in length and without evident wings.

The following key summarizes the numerous differences between the two species:

Achene elliptic, broadest near the middle, the apex constricted into conspicuous collar-like flange; tubercle conic-attenuate, arising out of the surrounding collar, not contracted at the base; perianth bristles exceeding one-half the length of the achene; spikelets few-flowered, 1–3-fruited, the rachis with short, congested internodes; divergent lower branch of well-developed inflorescence commonly bearing a secondary branch, each with a pulvinate bract in the axil; leaf tips obtuse, entire ..... *R. oligantha.*

Achene obovoid, broadest above the middle, the apex without a conspicuous collar-like flange; tubercle depressed-conic, abruptly contracted at the base; perianth bristles one-half the length of the achene or shorter; spikelets several-flowered, 3–8-fruited, the rachis anfractuose-elongate, the internodes produced between the achenes; divergent lower branch of well-developed inflorescence usually simple, thus with only one pulvinate bract; leaf tips acute or acuminate, minutely serrulate ..... *R. breviseta.*

The collections of *Rhynchospora breviseta* cited below are in addition to those included by Gale and Kükenthal. North Carolina: Brunswick County, *Wood & Clement 7063* (DUKE, GH); Craven County, *Wood & Clement 6997* (GH). Mississippi: Jackson County, *Channell 3208, 3257 & 3663* (GH, duplicates to be distributed).

Rhynchospora breviseta was not previously known to occur in the United States outside of Florida, and these collections extend the range of the species northward into North Carolina

and westward into Mississippi, well into the range of *R. oligantha* in both directions. It is a significant fact that the writer's number *3257* originally comprised a large collection of a mixture of *R. breviseta* and *R. oligantha*. Material of the latter species was segregated only after examination in the laboratory to comprise his number *3258*. This information is presented as unequivocal evidence that the two species occur together in the field, at least in Jackson County, Mississippi.

Even though an inconspicuous element in the flora, without doubt having generally been passed unnoticed, *Rhynchospora breviseta* is to be expected to occur elsewhere on the Atlantic and Gulf Coastal Plain. Future collecting is likely to result in the discovery of the species over an even wider range as well as in areas between those already reported.

Differences in the structure of the inflorescences of *Rhynchospora oligantha* and *R. breviseta* mentioned in the preceding key apparently have been generally overlooked. Except in terms of general form, in fact, the details of inflorescence structure appear nowhere in the genus to have been adequately described. The remainder of this paper is therefore devoted to the description and comparison of the inflorescences of these and related species. In terms of relating species and species groups it would appear that the inflorescence may yield characters which could serve to supplement those of the fruit upon which the taxonomy of the entire genus has been thus far so singularly dependent.

Although of the same fundamental structure, both lateral and terminal inflorescences are produced by the two species in question. Both types are clearly reduced forms of a more extensive and open prototype, as suggested by a comparison with the inflorescences of other species. In addition, *Rhynchospora oligantha* and *R. breviseta* themselves exhibit in a variety of stages a remarkable reduction series. This series strongly suggests the course of the reduction process. In general, the inflorescences of *R. breviseta* (Fig. 6) have undergone reduction to a greater degree than those of *R. oligantha* (Fig. 1) and the two species can usually be distinguished on this basis.

The lateral inflorescences (not figured) are borne on long, flattened, upwardly serrulate peduncles arising singly out of

the closed leaf-sheaths of the mid and lower culm. In their simplest form these consist of a single ebracteate or bracteate spikelet. Frequently, however, the lateral inflorescences are compound and consist of fascicles of pedicellate spikelets. In such cases each fascicle is subtended by a 1-nerved, somewhat vaginate, keeled bract, serrulate at the apex. In compound inflorescences each of the component pedicellate spikelets is, in turn, subtended by an additional (ultimate) bract of distinctly scarious texture (Fig. 5). These ultimate bracts would appear to correspond to the prophylls of grasses. Ranging in length from 3–5 mm., these thin, glabrous, ultimate bracts are more or less oblong in shape and have obtusish apices. Each is longitudinally 2-nerved, one nerve being located on each of the two keels of the convex back. The basal portion of the blade of each of these bracts ensheathes the pedicel it subtends. Structurally, the lateral inflorescences thus possess only two orders of bracts: those of the inflorescence fascicles and those of the individual pedicellate spikelets.

The terminal inflorescences differ from the lateral in being sessile, that is, in lacking a common peduncle. Thus each, regardless of the degree of branching, is brought into close proximity to the uppermost leaf. This leaf is regarded as the primary (lowermost) bract of the terminal inflorescence-system, although it is little modified as compared with ordinary cauline leaves. The sheath portion is open, distinctly vaginate and thin-margined; the blade portion is concave and, although not rendered in the accompanying drawings, is minutely serrulate on the margin at the base, becoming entire above and finally indistinguishable from typical leaves toward the tip. The retention by the primary bract of foliar features characteristic of ordinary leaves renders it easily distinguishable from the highly modified, distinctly keeled bracts which often subtend each fascicular unit of the inflorescence. Appearing to be a continuation of the culm, the primary bract is to each over-all terminal inflorescence-system morphologically comparable to the bract subtending each individual inflorescence-fascicle. The terminal inflorescences may thus possess bracts of three orders, as shown in Figure 1, the primary bract just described in addition to the two types described for and common to the lateral, axillary

inflorescences. Bracts of secondary order may sometimes be absent altogether.

In compound inflorescences the lower branch is commonly and characteristically lateral in position and bears a conspicuous tuberculate enlargement (Figs. 1 & 6) in its axil. This pulvinate structure is clearly related to the lateral position ultimately assumed by the lower branch, in growth or enlargement doubtless serving to expand the inflorescence. Of more or less callous tissue, this pouch-like process is morphologically appendicular, belonging to the ultimate bract (Fig. 5) (prophyll) of the inflorescence, that is, the bract immediately subtending the individual pedicellate spikelets. For each inflorescence, however, only (0–)1–2 of these bracts bear such a process. As clarified in the accompanying key, the two species in question usually differ in this respect: *Rhynchospora oligantha* often bears two such bracts to each of the more well-developed inflorescences; *R. breviseta* usually bears only one.

There is considerable variation among the inflorescences as to the degree of development, even in the same collection or individual clump. The most fully developed inflorescence is of a characteristically corymbiform type, the primary axes of which may be twice or thrice branched. In less well developed inflorescences the primary axes are simple, arranged in a sort of umbellate cluster. Due to the failure of certain spikelets to develop, there are often present more ultimate bracts (prophylls) per inflorescence-fascicle than spikelets, for the bract subtending each pedicel is oftentimes produced whether the spikelet develops or not. Those inflorescences in which only the lateral axis develops owe their unilateral form to the retention of an axillary bract bearing a tuberculate process at the base. Occasionally the axillary inflorescences are severely reduced, represented merely by a single pedicellate, ebracteate spikelet. This condition, however, is less common than the others described and is usually associated with a more basal position of the spikelet on the culm.

The inflorescences of *Rhynchospora oligantha* and *R. breviseta* are quite unlike the more congested, spiciform or glomerate inflorescences of *R. plumosa* (including var. *interrupta*) and *R. intermedia*, the two pairs of species usually being separable

in the field on this basis. This is due to the distinctly pedicellate nature of the spikelets of the former pair as contrasted with the subsessile nature of the spikelets of the latter. Of the plumose-bristled Rhynchosporas, the inflorescences of *R. oligantha* and *R. breviseta* find their closest match in those of *R. diadon* which has only terminal inflorescences. Although more extensively branched and more floriferous, but in general more compactly corymbiform, the inflorescences of this species are nevertheless very similar to those of *R. oligantha* and *R. breviseta* in structural detail. The bracts associated with the inflorescence are of three orders, one of the ultimate, axillary bracts of each inflorescence-fascicle being dorsally spurred or pulvinate. The pattern of branching is identical and the lowermost branch of each inflorescence-fascicle assumes a lateral or divergent position. From this standpoint, therefore, the inflorescence of *R. diadon* suggests a logical prototype of *R. oligantha* and *R. breviseta*. The similarities in the structure of the inflorescences of these three species represent an additional correlative characteristic, not previously emphasized, which favors the retention of *R. diadon* in the Plumosae.

In fundamental details of structure and especially in general appearance, the inflorescences of *Rhynchospora oligantha* and *R. breviseta* are quite comparable to those of *R. rariflora* (Michx.) Ell., although the latter belongs to a different series (Rariflorae) which lacks plumose perianth bristles. In the field, therefore, it is often more difficult to distinguish *R. rariflora* from *R. oligantha* and *R. breviseta* than to distinguish the latter two species from *R. plumosa* and *R. intermedia*.—HARVARD UNIVERSITY, CAMBRIDGE, MASS.

THE GENUS PETERIA (LEGUMINOSAE)[1]

C. L. Porter

History of the Genus

The North American genus *Peteria* was established by Asa Gray[2] in 1852, and named in honor of Dr. Robert Peter who had been active in research on the flora of Kentucky. The genus was based on a single species, *Peteria scoparia* A. Gray, typified by collections made by Wright in Trans-Pecos Texas in 1849 and in southern New Mexico in 1851, and a collection made by Wislizenus in Chihuahua in 1846. Gray referred the genus to the tribe *Galegeae* and indicated that it was distinct from other genera of that tribe because of the stipules consisting of a pair of divaricate prickles like those found in the genus *Caragana*, and because of the "aspergilliform" style and stigma, terminated by a tuft of hairs, this latter feature reminding him of the genus *Lessertia*.

The genus was accepted by Bentham and Hooker[3] in 1865, who placed it in the *Galegeae* between *Lamprolobium*, a genus found in Australia, and *Barbieria*, a genus of tropical South America. These authors, however, erroneously described the stipules as being "subulate," and they also misrepresented the plants as being "glabrous" and the "stylus inflexus, apice sub stigmate circumcirca barbatus, stigmate capitato terminali."

In 1873 Sereno Watson[4] added another species, *Peteria Thompsonae*, based on specimens collected in southern Utah in 1872 by Mrs. Ellen P. Thompson (sometimes erroneously written as "Mrs. A. P. Thompson"), the sister of Major John Wesley Powell of Colorado River fame whose headquarters at the time were at Kanab, Utah.[5]

In 1876, J. G. Schaffner collected additional specimens of the genus near San Louis Potosi, Mexico, and noted that the thick, tuberous roots of the plants were eaten by the natives there

[1] Contributions from the Department of Botany and the Rocky Mountain Herbarium, University of Wyoming. No. 228.

[2] Pl. Wright. 1: 50. 1852.

[3] Gen. Pl. 1: (2): 495. 1865.

[4] Am. Nat. 7: 300. 1873.

[5] see Ewan, J. A., Rocky Mountain Naturalists. University of Denver Press, p. 321. 1950.

who called them "camote del monte," or mountain sweet potato; and in 1878 Parry and Palmer secured additional specimens from the same region. Based on these collections, *Peteria scoparia* var. *glandulosa* A. Gray was published by Sereno Watson[6] in 1882. It was noted that these plants bore a resemblance to *Peteria scoparia*, but were much more viscid-glandular on the calyx and pedicels.

The genus was taken up by P. Taubert[7] in his treatment of the family in Die natürlichen Pflanzenfamilien where it was placed in the tribe *Galegeae*, subtribe *Tephrosiinae*. Taubert described the genus as being monotypic, and credited *Peteria scoparia* to New Mexico only. The species was illustrated by an excellent small figure in the text.

There the matter stood until 1923, when P. A. Rydberg[8] published an account of the genus in which he raised var. *glandulosa* to specific rank, bringing the total species to three. Rydberg placed the genus in the tribe *Galegeae*, subtribe *Craccanae* (the same as the subtribe *Tephrosiinae*), in sequence after *Galega* and *Cracca* (*Tephrosia*), the three genera in the North American Flora included in that subtribe.

Ivar Tidestrom[9] published *Peteria nevadensis* in 1923 on the basis of plants collected by him near Las Vegas, Nevada, in 1919, which were supposed to possess characters similar to those of *Peteria Thompsonae* but with smaller size of plants and flowers and narrower calyx-lobes. These differences given by Tidestrom were not convincing, being quantitative rather than qualitative, and it has been found that they fit well within the general pattern of variability of *Peteria Thompsonae*. Furthermore, the populations in Utah and Nevada and adjacent Arizona occupy a continuous area and very similar ecological situations.

The present writer became interested in the genus while engaged in a study of Nevada legumes in the course of which it became necessary to compare the types of the above two names, and to examine all the material that could be found of these plants in the larger herbaria. It seemed worthwhile to explore the remainder of the genus, particularly when it was discovered

[6] Proc. Am. Acad. 17: 342. 1882.
[7] Engl. & Prantl, Nat. Pflanzenfam. III. Abt. 2, 267, 273. 1894.
[8] N. Am. Fl. 24: (3): 183–184. 1923.
[9] Proc. Biol. Soc. Wash. 36: 183. 1923.

that an apparently undescribed species has been unrecognized for a number of years.

General Morphology

ROOTS. The root system of the genus *Peteria* is imperfectly known, being present on herbarium specimens of only two of the species, *P. Thompsonae* and *P. glandulosa*, in both of which there is a thickened tuberous root which is deep-seated, tapering above and below. In the other two species, *P. scoparia* and *P. pinetorum*, it is presumed that a similar root type occurs, but no specimens showing this feature have been found, the plants having invariably been broken off above the level of such tubers. Kearney and Peebles[10] have noted "the tuberous rootstocks of *P. scoparia*, known in Texas as camote-de-monte, are reported to be edible," but that statement probably was taken from Gray's description of *P. scoparia* var. *glandulosa* (treated hereafter as *P. glandulosa*), and Gray in turn derived it from the label on *Schaffner 834* which became the type of Gray's variety. The fourth species, *P. pinetorum* described below, is based on several duplicates of a single collection, none of which shows the roots.

STEMS. The stem is that of a typical herbaceous perennial arising from a somewhat lignescent base. In *P. scoparia* the stems are erect and usually bushy-branched from near the base, rounded in cross section, and longitudinally striate. In *P. Thompsonae* the stem is erect and branched above, but usually single below. *P. glandulosa* is a low bushy plant with stems erect or often decumbent and sprawling, branching from near the base. The greatly elongated stems of *P. pinetorum* are weak and with elongated internodes, attaining a height of 1 m. or more.

LEAVES. In all species the leaves are petiolate and odd-pinnate with several to many leaflets. In three of the species, *P. scoparia*, *P. glandulosa*, and *P. pinetorum*, the leaflets are more or less similar, small and numerous, and narrowly oblong to elliptic in outline. In *P. scoparia* alone the leaflets are readily deciduous from the rachises, and in late summer or during dry periods the plants take on a characteristic broom-like appear-

[10] U.S.D.A. Miscel. Publ. 423: 465. 1942; Ariz. Flora 441. 1951.

ance which suggested the name given them by Gray. In the other species the leaflets are persistent. *Peteria Thompsonae* has much larger leaflets which are rounded or retuse at the apex and oval to obovate in shape, much like those of several species of *Astragalus* found in the same area.

STIPULES. The stipules in all species consist of a pair of stiff, sharp, slender prickles which are widely divaricate, 2–10 mm. long, and stramineous or brownish in color.

PUBESCENCE. The plants show varying degrees of pubescence, but all have the same type of hairs which are simple, basifixed, somewhat flattened, mostly pure white in color, and appressed. The pubescence is usually more abundant on the margins of the leaflets and on their veins below. There is a tendency for the species to produce glandular hairs on the pedicels and calyx, this being best developed in *P. glandulosa*.

INFLORESCENCE. The inflorescence is a narrow raceme of varying length, arising either terminally or opposite the leaves, never axillary. The flowers are subtended by narrow subulate bracts, and there are no bracteoles. There seems to be a general tendency, except in *P. Thompsonae*, for a number of the flowers to abort or drop off, leaving flowerless gaps in the inflorescence and often only a few fruits.

CALYX. The calyx consists of two parts: a tubular portion which is cylindric-campanulate and slightly gibbous at the base above, and five somewhat unequal lobes which are deltoid-acuminate to narrowly lanceolate-acuminate, these lobes the same length as the tube or shorter, and the two upper ones united farther up than the three lower ones. The calyx is not much changed after anthesis.

COROLLA. The corolla is papilionaceous, and the petals are long-clawed, the claws very slender and as long as the blades or a little shorter. The banner is strongly folded lengthwise and its sides are reflexed. The wings are somewhat smaller than the banner and slightly auricled. The keel petals are a little shorter than the wings, and they have a broad auricle at the base of the blade. The color of the corolla is white to ochroleucous or tinged with purple; in *P. Thompsonae*, at least, the keel is maculate.

STAMENS. The stamens are diadelphous, nine of them with

their filaments fused into a cylindric tube, the upper one entirely free. The anthers are all alike, 2-celled, and oblong.

PISTIL. The pistil is unicarpellate, short-stipitate or subsessile, the ovary laterally flattened and without any intrusion of sutures, several-ovuled, the style bent upward and with a widened basal portion which at length becomes hardened, horny, and spirally twisted, the stigma a tuft of short hairs surrounding the apex of the style and slightly oblique.

FRUIT. The fruit is a legume which is linear or narrowly oblong, nearly straight, slightly if any constricted between the seeds or at places where ovules have aborted, laterally flattened, subsessile or with a stipe up to 5 mm. long in *P. pinetorum*, few-seeded, dehiscent along both sutures.

SEEDS. The seeds are rounded-oblong and flattened, the funiculus attached near the end. They are not strophiolate.

Cytology

Nothing is known concerning the cytology of this genus. It is not mentioned in the works of Chekov[11] nor of Senn.[12] An attempt to germinate a few seeds taken from herbarium specimens was unsuccessful and no root tips were obtained. In discussing relationships in the legumes, Senn (l.c.) makes the statement that the evidence of both Chekov and himself indicates that the tribes *Hedysareae*, *Galegeae*, and *Genisteae* are highly heterogeneous assemblages with relatively little relationship.

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Taxonomy

Peteria A. Gray, Pl. Wright. **1: 50.** 1852; Bentham & Hooker, Gen. Pl. **1** (2): 495. 1865; Taubert in Engl. & Prantl, Nat. Pflanzenfam. III. Abt. 3, 273. 1894; Rydberg in N. Am. Fl. **24** (3): 183. 1923.

Erect or sprawling herbs from a deep tuberous root. Leaves odd-

[11] Bull. Soc. Nat. Mosc. Biol. 46 (4): 233–240. 1937.
[12] Bibliog. Genet. 12: 175–336. 1938.

pinnate, 7–many-foliolate, without stipels, the stipules a pair of slender divaricate prickles. Flowers in terminal racemes or sometimes the racemes lateral and then opposite the leaves, not axillary, papilionaceous, on short pedicels, subtended by subulate bracts, ebracteolate. Calyx cylindric-campanulate, slightly gibbous at the base above, unequally 5-lobed, the sinus between the two upper lobes shallower than the others. Corolla white or ochroleucous, sometimes tinged with purple, the petals with very slender claws; banner obovate-oblong, moderately to strongly arched, folded lengthwise and the sides reflexed; wings oblong to obovate, somewhat auricled at the base; keel petals obliquely obovate, obtuse, with a broad basal auricle. Stamens 10, diadelphous, the upper one with a free filament; anthers all alike. Ovary sessile or short-stipitate, several-ovuled, the style becoming hardened and twisted at the base and incurved, the stigma a slightly oblique tuft of short hairs on the end of the style. Pod linear or narrowly oblong, straight or nearly so, laterally flattened, little or not at all constricted where ovules have aborted, dehiscent along both sutures. Seeds few to several.

Type species: *Peteria scoparia* A. Gray.

Key to the Species

Leaflets rounded or retuse at the apex, 5–10 mm. wide, oval to obovate; corolla 15–20 mm. long; Utah, Nevada, and northern Arizona ..... 1. *P. Thompsonae.*

Leaflets acute or at least mucronate-pointed, not more than 5 mm. wide, usually oblong or narrowly elliptical; corolla not more than 15 mm. long; eastern Arizona to western Texas and southward through Mexico.

Stems about 1 m. high; leaflets 6–12 mm. long, flat; pods 6–7 cm. long; plants of the pine forests of northern Mexico ..... 2. *P. pinetorum.*

Stems lower, seldom over 6 dm. high; leaflets mostly much smaller, flat or involute; pods shorter; plants of dry plains and hills.

Calyx and pedicels strigose or slightly glandular; leaflets early deciduous; stems mostly 5–8 dm. high, with ascending branches; southeastern Arizona to western Texas and south ward to Chihuahua ..... 3. *P. scoparia.*

Calyx and pedicels densely glandular; leaflets persistent; stems mostly 1–3 dm. high, with divaricate branches; San Luis Potosi and Zacatecas to Puebla ..... 4. *P. glandulosa.*

1. **Peteria Thompsonae** S. Wats.

Peteria Thompsonae S. Wats. Am. Nat. **7:** 300. 1873.
Peteria nevadensis Tidestr. Proc. Biol. Soc. Wash. **36:** 183. 1923.

Erect and usually several-stemmed from the base, 2–5 (1–6) dm. high, the stems with a few branches near the base, glabrous to sparsely strigose. Leaves odd-pinnate, 7–16 (5–20) cm. long, the rachis usually densely appressed-strigose, bearing 13–21 (11–25) oval or obovate, often slightly

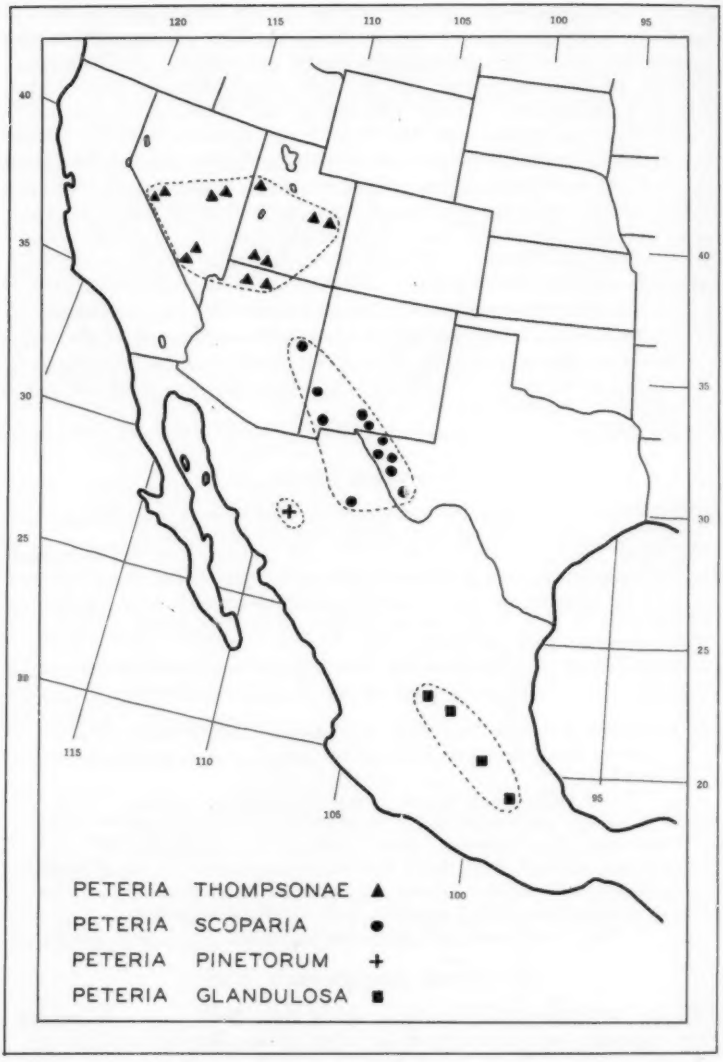

Fig. 1. Map showing distribution of species of *Peteria*.

emarginate leaflets 6–15 mm. long and 4–12 mm. wide, these glabrous to strigose above, strigose beneath, persistent. Stipular spines 2–5 mm. long. Racemes 1–2 dm. long, several-flowered, the pedicels and calyx slightly to moderately glandular-puberulent. Calyx tube mostly 9–10 mm. long, the teeth 7–9 mm. long. Corolla 15–23 mm. long. Pods about 5 cm. long, 5 mm. wide.

TYPE: Kanab, Kane Co., Utah, *Mrs. E. P. Thompson* (A. P. Thompson on label by error), s.n. in 1872 (GH; isotype US; phototype RM).

HABITAT: desert washes and gravelly slopes of dry hills and mesas.

RANGE: southern half of Utah and Nevada and adjacent northwestern Arizona.

SPECIMENS EXAMINED:—**Utah.** Without definite locality: southern Utah, *Capt. F. M. Bishop 160* in 1872 (US), and by the same collector in 1873, s.n. (GH, F). EMERY COUNTY (or possibly GRAND COUNTY): Green River, May 9, 1890, *M. E. Jones* s.n. (MO, US); same locality May 23, 1914, *M. E. Jones* s.n. (RM). GRAND COUNTY: Cisco, May 9, 1890, *M. E. Jones 1676* (ARIZ, RM). JUAB COUNTY: desert shadscale, common in shallow washes, 5,000 ft., 11 miles south of Troutcreek, June 17, 1933, *Maguire & Becraft 2664* (GH, MO, RM, US), and by the same collectors *2665* (MO). KANE COUNTY: Kanab, *Mrs. E. P. Thompson* (A. P. Thompson on label by error) s.n. in 1872 (type GH, isotype US, phototype RM); Kanab, 5,500 ft., May 22, 1894, *M. E. Jones 5286* (US). WASHINGTON COUNTY: Springdale, 4,000 ft., May 16, 1894, *M. E. Jones 5230* (MO, RM, US). **Nevada.** CLARK COUNTY: on mesa 16 miles northeast of Las Vegas, 840 meters, April 23, 1919, *Tidestrom 9083* (type of *P. nevadensis* US, isotypes GH, US, phototype RM). ESMERALDA COUNTY: in wash, base of Montezuma Mt., 1650 meters, June 6, 1919, *Tidestrom 9791* (NA, US). NYE COUNTY: 20 miles southwest of Currant, May 14, 1941, *Eastwood & Howell 9422* (GH, F, US); frequent, shadscale-mixed desert, gravelly-sandy soil, ¾ mile north of Locke's Ranch, May 21, 1945, *Maguire & Holmgren 25127* (ARIZ, MO, NA, photo RM).

2. **Peteria pinetorum** sp. nov.

Herba fere 1 m. alta, caulis erectus, gracilis, internodis 2–5 cm. longis; foliis 3–7 cm. longis; foliolis persistentibus, interdum 13–17, 2–3 mm. latis, 6–12 mm. longis, anguste ellipticis vel oblongis, in apice mucronatis; stipulis spinosis, 3–5 mm. longis; racemis fructu plus minusve 1–2 dm. longis; calycibus fructu pubescentibus glandulosis; leguminibus lineato-oblanceolatis, 4–7 cm. longis, 5 mm. latis, stipitibus fere 5 mm. longis; floris ignotis.

Spreading, bushy herb about 1 m. high, with slender, sparingly pubescent stems bearing rather distant leaves, the internodes 2–5 cm. long. Leaves 3–7 cm. long, the leaflets persistent, mostly 13–17, narrowly elliptical or oblong, 2–3 mm. wide and 6–12 mm. long, acutish and mucronate at the tip, short petiolulate, with a prominent purplish-black and strigose midrib and occasional strigose hairs on the margin but otherwise glabrous, the pairs of leaflets 3–5 mm. distant from each other. Stipules a pair of divaricate setose spines 3–5 mm. long. Inflorescence a terminal raceme 1–2 dm. long or more, the upper part of the rachis bearing only distant

awl-shaped bracts when in fruit, the few fruits produced only from its base, the lowest fruit from a leaf-axil. Axis and pedicels moderately glandular-pubescent. Flowers not known. Fruiting pedicels 7–14 mm. (mostly about 10 mm.) long. Fruiting calyx cylindrical, somewhat gibbous at the base, glandular-pubescent, the tube about 6 mm. long, the teeth narrowly lanceolate, about 3 mm. long. Pods linear-oblanceolate, straight, with a stipe about 5 mm. long, the body 4–7 cm. long, the maximum width about 5 mm. Ovules several, and seeds 2–5, oblong, 5–6 mm. long, 3 mm. wide.

TYPE: Los Cascarones, Rio Mayo, Chihuahua, Mexico, *H. S. Gentry 2658* (GH; isotypes ARIZ, F, MO, US; phototype RM).

HABITAT: cool pine slopes at about 7,000 ft. elevation.

RANGE: known only from the western slope of the Sierra Madre Occidental in the Rio Mayo region of western Chihuahua near the Sonora border.

This plant had been identified by Dr. Paul Standley as *Peteria glandulosa* (Gray) Rydb., which is perhaps its nearest relative. It differs greatly from that species, however, in habitat and in general aspect, being the tallest of all species in the genus, and in having larger and less crowded leaflets than in either *P. glandulosa* or *P. scoparia* but of the same general type as in those species. It further differs from *P. scoparia*, a plant of dry plains and foothills, in persistence of leaflets and in lacking the characteristic bushy "broom-like" aspect of that species. It is known only from a single but widely distributed collection which was in fruiting condition and lacked flowers. It is presumed to have the tuberous roots of *P. glandulosa*, but none was found on the specimens.

3. **Peteria scoparia** A. Gray

Peteria scoparia A. Gray, Pl. Wright. **1:** 50. 1852.

Stems bushy, 5–10 (mostly about 6) dm. high, the numerous branches ascending or somewhat divaricate, glabrous or nearly so, pale green and striate, up to 5 mm. thick at the base. Leaves 5–10 cm. long, with a slender, persistent rachis bearing 9–15 narrowly elliptic to oblong, mucronate leaflets 3–6 (2–11) mm. long and 1–2 mm. wide, the leaflets usually deciduous to give the plants a characteristic broom-like appearance during the dry season, glabrous except on margin above, strigose beneath, acutish and mucronate at the apex, the pairs of leaflets mostly 3–5 mm. distant from each other. Stipules a pair of divaricate setose spines 3–5 (2–6) mm. long. Racemes 1–2 dm. long, several-flowered, the pedicels and calyx slightly glandular-puberulent. Calyx tube about 5 mm. long, the teeth 2–3 mm. long. Corolla 13–16 mm. long. Pods 3.5–6 cm. long, 4–5 mm. wide.

TYPE: mountain valleys beyond the pass of the Limpia (Texas, prob-

ably near Alpine, Brewster County), *Charles Wright 138*, collected in 1849 (GH, isotype GH).

HABITAT: dry hills, mesas, and rolling plains, up to about 4,600 ft.

RANGE: from the Petrified Forest, Apache County, Arizona, southeastward through southwestern New Mexico to Trans-Pecos Texas and northeastern Chihuahua.

SPECIMENS EXAMINED:—**Arizona.** APACHE COUNTY: Petrified Forest, July 4, 1936, *Toole & Goodding* s.n. (US). **New Mexico.** DONA ANA COUNTY: mesa west of the Organ Mts. (Tortugas Mt.), August 19, 1906, *E. O. Wooton* s.n. (ARIZ, MO, RM); Tortugas Mt. southeast of Las Cruces, 4,600 ft., July and August 1906, *Wooton & Standley* s.n. (US). GRANT COUNTY: Telegraph Mts., August 16, 1902, *E. O. Wooton* s.n. (US). LUNA COUNTY: between Frontera and Mimbres, July 1851, *C. Wright 962* (GH, US). **Texas.** Without definite locality: *Sutton Hayes 159* (GH); prairie near foot of Capote Mt., October 1883, *V. Havard* s.n. (US). BREWSTER COUNTY: mountain valleys beyond the pass of the Limpia, August 1849, *C. Wright 138* (type GH); rare on Sul Ross College Hill, Alpine, August 12, 1937, *B. H. Warnock T429* (GH, US). CULBERSON COUNTY: Guadalupe Mt., in 1881, *V. Havard 51* (GH); calcareous stony soil, banks and slopes along Pine Springs Canyon, Guadalupe Mts., July 21, 1943, *U. T. Waterfall 5240* (GH, MO). HUDSPETH COUNTY: light gray calcareous soil in grassy flat between low hills approaching Sierra Diablo Plateau, 11½ miles north of Allamore, July 28, 1943, *U. T. Waterfall 5350* (GH, MO); igneous cliffs in the Eagle Mts., about 2,000 ft. above Quitman Valley, southeast of the old Love Ranch, about 35 miles southeast of Sierra Blanca, August 22, 1946, *U. T. Waterfall 6717* (GH. MO), JEFF DAVIS COUNTY: Goat Canyon, Geo. Jones Ranch, Davis Mts., about 5,000 ft., July 16, 1936, *L. C. Hinckley* s.n. (ARIZ, GH); Goat Canyon, Mt. Livermore, July 30, 1935, *L. C. Hinckley 423* (F). **Mexico. Chihuahua:** near Lake Encinillas north of Chihuahua, August 21, 1846, *A. Wislizenus 126* (MO, fragment GH).

4. **Peteria glandulosa** (A. Gray) Rydb.

Peteria scoparia var. *glandulosa* A. Gray ex S. Wats., Proc. Am. Acad. **17:** 342. 1882.

Peteria glandulosa (A. Gray) Rydb. N. Am. Fl. **24:** 183. 1923.

Sprawling herb from a thick tuberous root, with divaricately branched pubescent stems mostly 1–3 dm. long. Leaves 1.5–3 cm. long, the leaflets mostly 9–15, narrowly elliptic, 1–3(–4) mm. wide, 2–5(–8) mm. long, very short-petiolulate, with a dark and strigose midrib and strigose margin, the pairs of leaflets 1–3 mm. distant from each other. Stipules a pair of divaricate setose spines 3–10 mm. long. Inflorescence a terminal raceme, mostly 6–16 cm. long, about 3–5-flowered, the lowest flowers from leaf-axils and a pair of stipular spines, the others from slender bracts, the pedicels and calyx, and often the axis of the raceme, densely glandular-puberulent. Flowers about 14–15 mm. long, the calyx-tube 7–8 mm. long, the lanceolate teeth 4–5 mm. long. Pods linear, straight or slightly constricted between the seeds, the body 4–4.5 cm. long, the maximum width 3–5 mm., and with a stipe 5–6 mm. long. Seeds about 5 per pod.

TYPE: Mexico, San Luis Potosí, in arenosis circa urbem, in 1876, *J. G.*

Schaffner 834 (GH, isotype US); paratype from the same locality in 1878, *Parry & Palmer 172* (GH).

HABITAT: dry, often calcareous hills and slopes.

RANGE: Mexico, from southern Zacatecas and San Louis Potosi to Puebla.

The geographic isolation, as well as the low aspect of the plants and their persistent leaflets, both seem to indicate specific rather than varietal rank for this plant.

SPECIMENS EXAMINED:—**Mexico. San Luis Potosí:** San Luis Potosí, in arenosis circa urbem, in 1876, *J. G. Schaffner 834* (type GH, phototype RM); same locality, in 1878, *Parry & Palmer 172* (paratype GH). **Puebla:** La Canada near Tehuacan, dry calcareous slopes, August 7, 1897, *C. G. Pringle 7482* (F, GH, MO, US); El Riego, July 1905, *Purpus 1188* (F, GH, MO). **Queretaro:** hills, San Juan del Rio, July 12, 1896, *C. G. Pringle 7285* (GH). **Zacatecas:** on mesas in dry ground, Ojo Caliente, April 30, 1892, *M. E. Jones 143* (US).

A NEW SPECIES OF STREPTANTHUS

GEORGE J. GOODMAN

Streptanthus squamiformis Goodman, sp. nov. Herba annua, saepe 0.5 m. alta in anthesi ad 1 m. alta in fructu, simplex vel interdum inflorescentia ramosa; foliis caulinis integris, ovatis, acutis, amplexicaulibus, glabratis; pedicellis ad maturate crassis ascendentibus fere rectis, usque ad 13 mm. longis, pilis late-patentibus crassis quidem prope receptaculum; calyce purpurello, 6–8 mm. longo, sepalis acutis ad apicem intro cucullatis, saccatis, capillatis, capillis densis conspicuis lucidis, 1–2 mm. longis, cylindricis, 0.12–0.18 mm. crassis in siccatione longitudinaliter complanatis squamoideis processis; petalis 12–14 mm. longis, ungulatis, lamina amplis purpureis, 6–7 mm. latis; staminibus liberis, antheris sagittatis apiculatisque; fructibus glabris, usque ad 14.5 cm. longis, 3 mm. latis; seminibus circa 60, oblongis, alatis, 3–3.3 mm. longis.

Streptanthus squamiformis Goodman, n. sp. Annual plants, often 0.5 m. tall in flower and up to 1 m. in fruit, simple or sometimes branched in the inflorescence; stem leaves entire, ovate, acute, clasping, glabrate; pedicels, at maturity, thick, ascending, nearly straight, up to 13 mm. long, with wide-spreading thick hairs at least near the receptacle; calyx purplish, 6–8 mm. long, sepals acute and hooded near the apex within, saccate, abundantly covered with conspicuous, clear hairs, these 1–2 mm. long, cylindric, 0.12–0.18 mm. thick, drying to longitudinally flattened scale-like processes; petals 12–14 mm. long, clawed, the broadened blade purple and 6–7 mm. wide; stamens free, anthers sagittate and apiculate; fruits glabrous, up to 14.5 cm. long, 3 mm. wide; seeds about 60, oblong, winged, 3–3.3 mm. long.

OKLAHOMA: McCurtain County: *Goodman 5507*, slopes of pine-oak forest, Beaver's Bend State Park, April 27, 1952 (Type, Bebb Herbarium of University of Oklahoma); *M. Hopkins* and *A.* and *R. Nelson 385*, Beaver's Bend State Park, May 20, 1944; *Little and Olmstead 74*, pine-oak area, north of Broken Bow, along Highway 21, June 6, 1930. ARKANSAS: Polk County: *Cooley R-23*, on sandstone and soft shale, Rich Mountain, east of Mena near Oklahoma line, May 13, 1944.

The April collection is in flower, the three May and June collections in fruit. The three collections other than the type were distributed as *S. maculatus*, to which the new species is closely related. The new species belongs, then, to the section Eustreptanthus, or Streptanthus as defined in a very narrow sense by O. E. Schulz in Die Natürlichen Pflanzenfamilien 17 b: 300. 1936.

The type collection was obtained from a population of plants that extended over an area of perhaps a hundred square yards. Over seventy plants were taken and a similar number were collected by Prof. U. T. Waterfall. The plants were very uniform, the color of the vegetative parts, the leaf shape, the flower color, and the hairs on the calyces showing little or no variation. No plants of the related *S. maculatus* were seen on this trip. In flower the new species is quickly recognized by the conspicuous hairs on the calyces which, upon drying, resemble scales. In fruit, at least a few of these scale-like hairs may be found on the thick pedicels.—DEPARTMENT OF PLANT SCIENCES, UNIVERSITY OF OKLAHOMA, NORMAN, OKLAHOMA.

Volume 58, no. 695, including pages 311–334, was issued 10 December, 1956.

ERRATA

Page 149, line 35; for **Meyerii** read **Meyeri.**
Page 150, line 1; for *Meyerii* read *Meyeri.*
Page 151, lines 40, and 44; for *Meyerii* read *Meyeri.*
Page 208, line 4; for *page* read *page.*
Page 268, line 1; *for* 8a. *read* 8b.
Cover No. 695, line 7; for **Praematurus** read **praematurus.**
Cover No. 695, line 10; for **Americana** read **americana.**
Page 315, line 24; for **serotinum** read **serotina.**

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